Hybrid course planning for PHYS 3370, Introduction to Theoretical Physics, William Shepherd

This is a small course, usually fewer than 20 students, which is near the beginning of our major-exclusive sequence for students; no students not taking a physics major or minor are expected. The function of this course in our major sequence is to bring the student’s mathematical skills and learning solidly into the physics context, develop an intuition for which mathematical techniques are relevant in which physical situations, and address a few points of higher mathematics that are not included as math courses in our major requirements due to credit-hours limitations.

This course develops and reinforces important foundational skills for our students in their more-advanced physics courses, so it is a perfect candidate for a specifications-grading approach, where instead of a small number of high-stakes evaluations there are shorter, repeatable ‘credentialing’ exercises in the form of ~30 minute long quizzes; a passing result on every topic is required to pass the course. Problem sets are an important part of this course, practicing the various techniques is the best way to develop intuition and straightforward facility with them. These will be required but graded primarily on completeness of attempts, not on perfection of results. The deadlines for problem sets will be relatively rigid in time, in contrast to the deep repeatability of the quizzes.

My experience of this previous Spring semester was that asynchronous video works well for most students as a lecture substitute, and synchronous meetings of any type should be reserved for more interactive learning. My plan for the course, therefore, is to deliver most content by video, and have in-person meetings be reserved for questions, example problems solved with student input, and for evaluations. Synchronous online sessions in the Spring were poorly attended, but still valuable, with recording of questions and responses made available to all students, but my goal will be to have excellent attendance in the in-person meetings in the Fall, which will be achieved by making them the venue for credentialing opportunities; every in-person meeting will be an opportunity to take one (or more) of the quizzes students are required to pass to complete the class, and any other opportunities will be rare.

I will hold the first course meeting in person, and then will on average hold one meeting per week in person as well, ending up at the higher end of the hybrid in-person fraction; a few earlier weeks will be skipped to enable more assessment opportunities at the end of the semester. Skipped weeks will be strategically chosen to coincide with the arrival of a new baby at home, anticipated in mid-September. This follows most closely the split-week model.

Lecture videos will be chunked by topic, and will have regular comprehension quizzes embedded in them, requiring student responses before allowing them to move on. These act as attention-span resets to at least some extent, if nothing else calling students back to the appropriate browser tab to move on, while still allowing contiguous material to remain in a single video presentation. While these can be graded, I intend to use them as a purely formative assessment opportunity.

Communication will be available through an online office module on Blackboard, including a discussion forum where I will reply to questions, as well as through online office hours during class times when in-person meetings are not being held (with exceptions clearly announced in advance as necessary).

The interactive and unscripted nature of the in-person meetings enables an easy handoff to another instructor in case of illness or other emergencies keeping me from being able to attend a particular meeting.